

# Do Religious Freedom vis-a-vis Trade Openness Affect Economic Growth? A Cross-Country Empirical Investigation

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## Abstract

Does religious freedom steer economic growth impact of trade-openness? This paper employs the method of moments-quantile regression to panel data of 117 developed and developing countries to show that countries that accommodate greater liberal religious beliefs enjoy, on average, higher growth in per capita income via deeper trade openness. Empirical results reveal that the dynamic nexus between trade and economic growth across developing countries is subject to the institutional environment. Therefore, results indicate that trade openness favours economic growth when institutional quality improves.

## Keywords

Trade Openness, Religious Freedom, Cross-Country Growth, Method of Moments-Panel Quantile Regression, Economic Growth

## 1. Introduction

An extant body of literature covering both intra- and inter-country settings has shown that trade openness tends to accelerate economic growth (see, among others, Yanikkaya, 2003; Manole & Spatareanu, 2010). While various socioeconomic and political determinants have been shown to moderate the dynamic long-term effects of openness on growth, countries' affine nature in religiosity could be a potential driver of growth and openness relationships. In particular, one may ask, does the persistence of certain types of religious beliefs shape growth and trade-openness relationships? In earlier work, Barro and McCleary

(2003) and Durlauf et al. (2012) have explored the macroeconomic effects of religious beliefs on aggregate economic outcomes. Moreover, Barro and McCleary (2003) have identified the two dimensions of religion, i.e., religious beliefs and participation in religious activities. The key findings from their study indicate that some aspects of religious beliefs positively correlated with economic growth, while religious activities measured through participation in church attendance negatively correlated with economic growth. Besides, they also suggest that higher levels of church attendance depress economic growth because attendance in the church could use a larger share of resources by the religious sector, while fewer resources could be used for the primary output sector. Therefore, they find a reverse relationship between religious belief and economic growth, indicating that less attendance in church generates more output and facilitates the economy to grow faster.

Previous literature examined the relationship between religious affiliations and economic growth in the context of economic growth determinants. For instance, Fernandez et al. (2001) find that Confucianism is one of the most determinants of economic growth. Moreover, they find that any historical or cultural explanations which are not necessarily related to religion have a heterogeneous impact on growth experiences. Nevertheless, Barro and McCleary's (2003) findings that religion matters for economic growth are an important insight which lies outside the domain of the canonical neoclassical model. Several scholars have given importance to various parameters for economic growth. The well-known works in this line of thought include Sachs (2003), finding that economic growth and other economic and demographic dimensions strongly correlate with geographical and ecological variables. Other prominent scholars also explain several valuable factors in cross-country differences, including Institutions (Acemoglu et al., 2001, 2002; Acemoglu & Johnson, 2005) and ethnic heterogeneity (Easterly & Levine, 1997; Alesina et al., 2003). The neoclassical models explained by several prominent scholars prove that religion has a specific role in economic growth, which represents the beginning of a new research direction in international economics, incorporating the growth models.

Nevertheless, in a related work focusing on nations' cultural characteristics, Inglehart and Baker (2000) and Deneulin and Rakodi (2011) argue that nations' culture determines the movement of economic growth. However, in these and similar studies, a cultural dimension is envisaged in the form of honesty and work ethics, among others. Religion is one of the critical dimensions of a country's culture. This can influence the extent of "trade dynamics" by controlling the type of import and export (reflecting religion-driven taste and preferences). Therefore, this paper investigates religion's role in the growth and trade-openness relationship. North (1990) argues that informal institutions' religious freedom, customs, ideology, and code of conduct have essential growth consequences in earlier work.

Similarly, previous studies like Woodberry (2012) argue that religious free-

dom, like modernity, has played a significant role in developing financial and political institutions leading to changes in growth dynamics in a country. More recently, the empirical work by [Rasoanomenjanahary et al. \(2022\)](#) finds that trade openness has an adverse effect on economic growth in Madagascar. Similarly, [Oppong-Baah et al. \(2022\)](#) find that trade openness and the real exchange rate substantially affect economic growth in Ghana and Nigeria. Further, [Mallick and Behera \(2020\)](#) find evidence of asymmetric cointegration between economic growth and trade openness in India during the pre-trade reforms period 1960-1990 and the post-trade reforms period 1991-2018. [Goldar et al. \(2020\)](#) examine the impact of trade liberalization in India during the late 1990s and 2000s on the productivity of manufacturing firms and find that the lowering of output tariff had a more significant impact on the productivity of Indian manufacturing firms than the lowering of tariff on intermediate inputs. Further, [Behera \(2014\)](#) found that after trade liberalisation in India, industries which experienced a decline in the tariff cost exhibited more substantial growth in domestic firms' productivity.

In our work, we ask a broad question: does religious freedom (have a heterogeneous) effect on economic growth and the trade-openness relationship? We contribute to the literature on economic growth and trade-openness literature by investigating the instrumental role of religious freedom. To explore the religious freedom heterogeneous impact on trade openness-economic growth nexus, we have selected panel data covering 117 countries consisting of developed and developing economies. Besides, following the World Development Indicators database of the World Bank and based on World Bank gross national income (GNI) per capita in current USD, our sample of 117 countries comprises high-income, upper-middle-income, and lower-middle-income countries. A robust empirical assessment of panel data covering 117 countries (comprising high-income, upper-middle-income, and lower-middle-income countries) reveals that religious freedom (like less liberal, moderate liberal, and high liberal) has a significant effect on economic growth-trade openness interdependence. However, the impact of religious freedom on the dynamic nexus between economic growth and trade openness is heterogeneous.<sup>1</sup>

**Figures 1-4** portray the relationship between religious freedom and economic growth (GDP per capita) across different groups of countries through a scatter-fitted line. **Figure 1** explains the relationship between religious freedom and economic growth in the case of a full panel of 117 countries consisting of developed and developing economies. It seems that the relationship between religious freedom and economic growth is positive (see **Figure 1**). Besides, the fitted line is not highly positive, indicating that highly liberal religious beliefs and practices have a specific impact on economic growth. However, the impact of religious

<sup>1</sup>Note that we have further subdivided the total sample of 117 countries based on the religious freedom (RF) index ( $0 < RF < 1$ ). The religious freedom (*RF*) data are collected from the familiar Gov-Data360 database of the World Bank. We consider that countries with  $RF \leq 0.5$ ,  $0.5 \leq RF \leq 0.75$ , and  $RF \geq 0.75$  are less liberal, moderately liberal and highly liberal countries (see **Table A1**, Appendix).

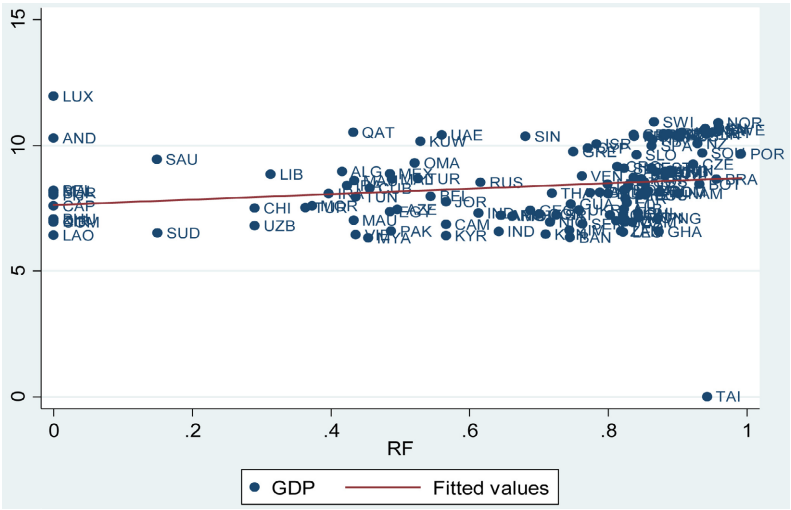


Figure 1. Religious freedom and GDP per capita, full-panel.

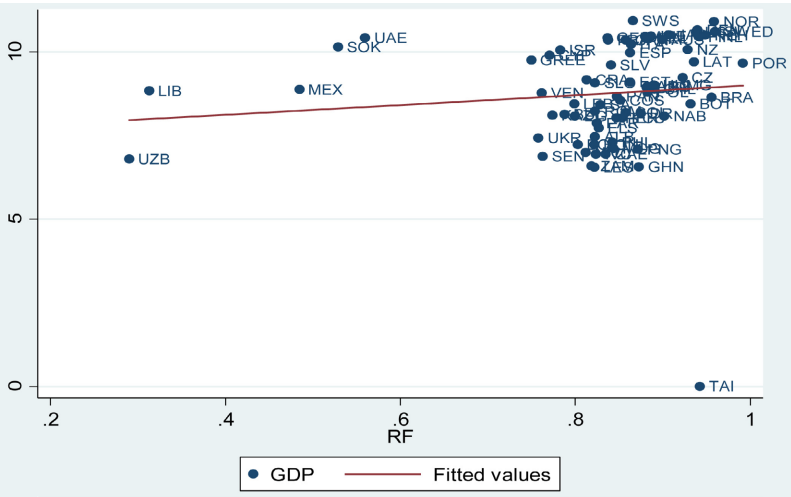


Figure 2. Religious freedom and GDP per capita, highly-liberal.

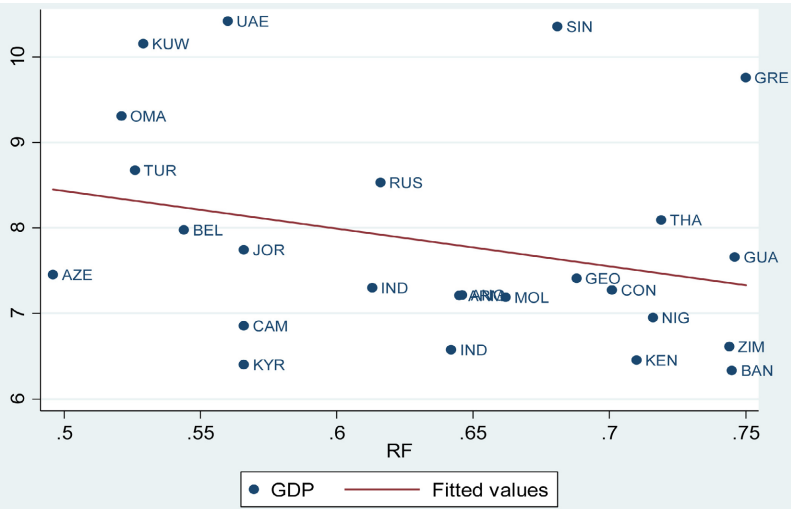
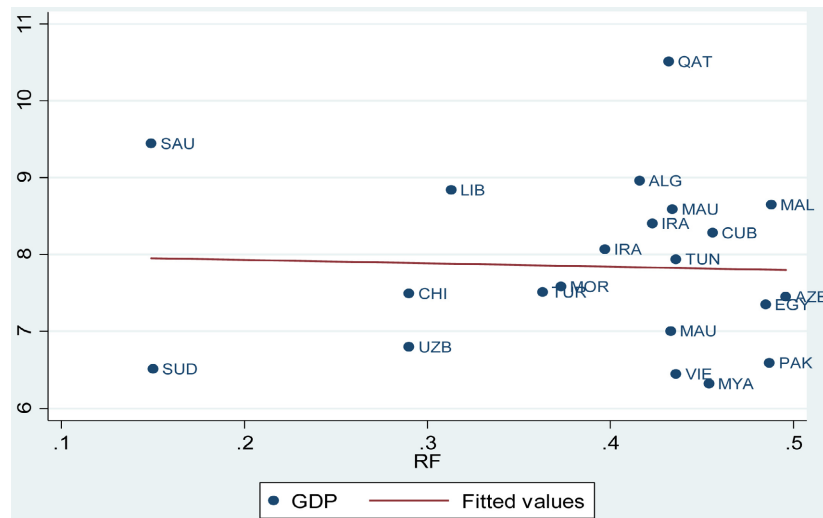


Figure 3. Religious freedom and GDP per capita, moderate-liberal.



**Figure 4.** Religious freedom and GDP per-capita, less-liberal.

freedom on economic growth is not substantially more decisive in the case of highly liberal groups of countries (see **Figure 1**).

Similarly, **Figure 2** explains the relationship between religious freedom and economic growth in the case of highly liberal religious groups of countries. The fitted line between freedom of religious faith and practices and countries' economic growth reveals a positive and upward movement relationship. Therefore, it shows that religious freedom significantly raises economic growth across groups of highly liberal religious countries. Nevertheless, the impact of religious beliefs, faith and practices on economic growth in other groups of countries is contrary to the previously fitted line and estimated results. Results reveal that the effects of religious belief and practices on economic growth are adverse in the case of moderate-liberal group countries (see **Figure 3**). In contrast, the impact of freedom of religious belief and practices on economic growth is relatively stagnant. Besides, the fitted line seems to be a horizontal straight line across countries with less liberal religious belief and practices (see **Figure 4**). Therefore, it is pretty inconclusive to arrive at a particular inference that freedom to religious belief and practices has any significant impact on economic growth across the countries with less liberal in religious practices and beliefs.

## 2. Empirical Construct and Estimation

### 2.1. Model

We follow prior literature and estimate a model that establishes interdependence between economic growth and trade openness (Equation (1)) (Yanikkaya, 2003; Manole & Spatareanu, 2010).

$$GDPpc_{it} = \alpha_i + \beta_1 TROP_{it} + \beta_2 Inst_{it} + \beta_3 Mac_{it} + \sum \beta_k X_{it}^k + \epsilon_{it} \quad (1)$$

where  $GDPpc$  is the per capita real GDP country  $i$  over a period  $t$  ( $t$  varies from 1990 to 2018).  $TROP$  represents trade openness;  $Inst$  is the institutional variable

representing law and order, government policy, and countries' stability. In the domain of institutional policies, we have taken autocratic (*AR*) and democratic regimes (*DR*) and religious freedom (*RF*) indexes. *Mac* indicates macroeconomic variables, including the market size (proxied by population (*TP*), human development index (*HDI*), macroeconomic price stability (proxied by the inflation rate, *INFR*), financial sector stability (proxied by external debt as a percentage of GDP, *EXTD*). The control variables (*X*) include social (*SG*) and political globalization (*PG*), financial globalization (*FG*), and countries' economic uncertainty index (*EUI*). All variables come from databases like World Development Indicators, Penn World Table, United Nations Development Program, Polity IV, KOF Index, and Economic Uncertainty Institute.<sup>2</sup>

## 2.2. Estimation

Trade openness may not exert a unique effect on the entire distribution of economic growth; it is possible that a unit rise in the degree of openness can impact growth higher at the lower quantile (because economies facing persistence constraints can show higher promise of growth due to greater availability of opportunities through openness) than for countries at the higher quantile of growth (because of the elasticity of response of growth to a further re-openness of trade). While a mean-based estimate can paint an average picture of the relationship between growth and trade moderated by religious freedom, a median-based (or quantile) regression can unravel the differential magnitude of effects. Further, quantile regression allows unobserved heterogeneity, heterogeneous covariate effects, and some conditional heteroscedasticity in the model and is supposed to be more robust than mean-based regression, like least-squares estimation (Koenker, 2005; Lamarche, 2008).

- **The mean-based regression**

In a typical least square approach, we specifically focus on estimating:

$$\begin{aligned} Q_{GDP_{pcit}}(\tau | TROP_{it}, Inst_{it}, Mac_{it}, X_{it}) \\ = \beta_1(\tau)TROP_{it} + \beta_2(\tau)Inst_{it} + \beta_3(\tau)Mac_{it} + \beta_k(\tau)X_{it} + \alpha_i \end{aligned} \quad (2)$$

In the case of conventional mean-based like least squares regression, the parameters  $\beta_1, \beta_2, \beta_3$ , and  $\beta_k$  capture the average or mean response of economic growth due to small changes in trade openness, institutional and macroeconomic, and control variables. The main missing part of this kind mean based least squares regression is the possibility of a heterogeneous response of per-capita economic growth due to a change in trade openness and other variables. Therefore, it is inevitable that the average response of the dependent variable is less informative of the actual dynamics between the regressors and the full range of distribution of the dependent variable. The nature of economic growth is heterogeneous, and it is subject to a set of independent and control variables across countries. Therefore, it is true that the analysis focuses on the

<sup>2</sup>See Table A2, Appendix for detailed discussion of variables definition and sources of the data.

mean of the distribution that might miss important distributional effects of trade and democracy dynamics on economic growth across different countries. Taking into the aspect of tails of the distribution, we may uncover richer evidence. Therefore, we use quantile regression to capture this effect, which analyses the impact of trade, institutions, and macroeconomic factors on the entire distribution of countries' economic growth. The nature of the data sets varies across cross-section means countries; over time, a panel data set for quantile regression would seem appropriate.

- **Quantile estimation: panel regression**

Lamarche (2008), Geraci and Bottai (2007) have explained the panel quantile regression estimator while controlling the individual-specific heterogeneity via fixed effects and exploring the impact of the heterogeneous covariates within the quantile regression models. The panel quantile regression framework that controls the individual-specific heterogeneity offers a more flexible approach than the classical Gaussian fixed and random effects estimators. Abrevaya and Dahl (2008) introduced an alternative approach to estimate quantile regression models for panel data while employing the correlated random-effects model of Chamberlain (1982). After introducing the fixed effects in quantile regression, the specification is written as follows:

$$\begin{aligned} Q_{GDPpc_{it}}(\tau | TROP_{it}, Inst_{it}, Mac_{it}, X_{it}) \\ = \beta_1(\tau)TROP_{it} + \beta_2(\tau)Inst_{it} + \beta_3(\tau)Mac_{it} + \beta_k(\tau)X_{it} + \alpha_i \end{aligned} \quad (3)$$

The parameter  $\beta(\tau)$  captures the effect of exogenous variables at the  $\tau$ -th quantile of the conditional distribution of countries' economic growth. This model can be estimated by solving the following minimization problem,

$$\begin{aligned} \min_{\beta\alpha} \sum_{i=1}^N \sum_{t=1}^T \rho_{\tau}(GDPpc_{it} - \beta_1(\tau)TROP_{it} - \beta_2(\tau)Inst_{it} \\ - \beta_3(\tau)Mac_{it} - \beta_k(\tau)X_{it} - \alpha_i) \end{aligned} \quad (4)$$

where  $\rho_{\tau}$  is the standard quantile regression check function (e.g., Koenker & Bassett, 1978; Koenker, 2005).

- **Endogeneity issues**

There are possible endogenous explanatory variables and endogeneity problems in the empirical estimation. Certain explanatory variables like institutional, macroeconomic, and control variables are correlated. The types of simultaneity bias are observed by the reverse causality of economic growth per capita and macroeconomic and institutional variables. At the same time, a rise in macroeconomics, financial stability and stable institutional policy can create a positive externality for the country's economic growth. Nevertheless, other types of endogeneity problems arise from the omitted variable bias. The inclusion of policy-oriented variables like institutional variables helps ameliorates the problem of endogeneity of GDP. However, it is still entirely plausible that variables like culture or geographic factors play a specific role in the economic growth-trade dynamics relationship. Therefore, to mitigate these types of endogeneity issues in

the models, this study has applied a recent estimation procedure, the Method of Moments-Quantile Regression (MM-QR), to address the endogeneity issues and robustness check. The MM-QR estimates the structural quantile function defined by Chernozhukov and Hansen (2008) using the method of Machado and Silva (2019).<sup>3</sup>

### 3. Results

Descriptive statistics are presented in Table 1. Table 2 shows quantile regression results for the total sample and sub-samples based on religious freedom (less liberal, moderate liberal, and high liberal). We find that the signs and magnitudes of the coefficients of trade openness vary across quantiles. This suggests that higher openness does not necessarily facilitate higher economic growth. More specifically, in the case of a full sample of 117 countries, the estimated coefficients of trade openness are negative and significantly different from zero at the 75th and 90th quantiles (see Columns 1 and 2, Table 2). This suggests that trade openness significantly dampens economic growth in mixed groups of countries, including developed and developing countries. Therefore, results exhibit that trade share as a percentage of GDP (representing trade openness) in certain circumstances during the phase of low financial development and macroeconomic instability dampens the economic growth of developing countries.

**Table 1.** Descriptive statistics.

	Min	Max	Mean	Std. Dev.	Jarque-Bera Probability
<i>GDPpc</i>	0.000	10.040	7.528	1.131	7067.494***
<i>TROP</i>	1.278	5.395	4.167	0.537	259.204***
<i>HDI</i>	0.000	0.832	0.606	0.139	2949.170***
<i>DR</i>	−88.000	10.000	3.291	11.500	167604.0***
<i>AR</i>	−88.000	9.000	0.691	10.962	192713.0***
<i>RF</i>	0.000	0.987	0.686	0.194	294.934***
<i>PG</i>	2.994	4.533	4.150	0.287	540.749***
<i>SG</i>	1.883	4.408	3.765	0.394	528.680***
<i>FG</i>	0.000	4.450	3.816	0.608	41360.34***
<i>INFR</i>	−3.305	8.920	1.822	1.308	815.656***
<i>EXTD</i>	−0.768	7.013	3.406	1.330	813.966***
<i>TP</i>	12.946	21.049	16.694	1.508	60.568
<i>EUI</i>	0.000	1.342	0.158	0.152	3810.852

Notes: *HDI*, *RF*, and *EUI* score varies from 0 to 1. *AR* and *DR* score ranges from 0 to 10. *PG*, *SG*, *TG*, and *FG* score ranges from 0 to 100. \*\*\* indicates significance at a 1% level.

<sup>3</sup>For detailed estimation procedure of MM-QR estimator, see Machado and Silva (2019).



**Table 2.** Quantile regression (QR) results.

	Full-panels		Less liberal (RF ≤ 0.5)		Moderate liberal (0.5 ≤ RF ≤ 0.75)		High liberal (RF ≥ 0.75)	
	1	2	3	4	5	6	7	8
	$\tau = 0.75$	$\tau = 0.90$	$\tau = 0.75$	$\tau = 0.90$	$\tau = 0.75$	$\tau = 0.90$	$\tau = 0.75$	$\tau = 0.90$
<i>TROP</i>	−0.328*** (0.074)	−0.099** (0.048)	0.133 (0.107)	0.273** (0.134)	0.441*** (0.083)	0.550*** (0.098)	−0.091 (0.096)	−0.236** (0.122)
<i>HDI</i>	2.886*** (0.494)	2.494*** (0.208)	2.805*** (0.248)	3.174*** (0.321)	0.314 (0.227)	0.894*** (0.232)	5.517*** (0.530)	5.686*** (0.842)
<i>DR</i>	−0.034*** (0.005)	−0.034*** (0.007)	−0.010* (0.006)	−0.003 (0.020)	−0.009 (0.009)	−0.001 (0.013)	−0.068*** (0.010)	−0.067*** (0.012)
<i>AR</i>	0.035*** (0.006)	0.035*** (0.007)	0.008 (0.006)	0.002 (0.021)	0.012 (0.009)	0.005 (0.012)	0.066*** (0.011)	0.063*** (0.013)
<i>RF</i>	0.665*** (0.206)	0.968*** (0.203)	−0.055 (0.261)	−0.401 (1.016)	−2.094*** (0.524)	−2.305*** (0.588)	0.657* (0.436)	0.627 (0.577)
<i>PG</i>	−0.041 (0.170)	0.045 (0.206)	0.217 (0.210)	−0.549 (0.402)	1.677*** (0.242)	1.372*** (0.202)	−0.163 (0.126)	−0.390 (0.337)
<i>SG</i>	1.165*** (0.173)	0.873*** (0.079)	0.920*** (0.134)	1.230*** (0.249)	1.358*** (0.172)	1.162*** (0.218)	1.112*** (0.288)	0.973** (0.467)
<i>FG</i>	0.444*** (0.060)	0.362*** (0.099)	0.185*** (0.078)	0.207 (0.147)	0.275*** (0.102)	0.516*** (0.141)	0.457*** (0.152)	0.510*** (0.206)
<i>INFR</i>	0.007 (0.017)	0.014 (0.019)	−0.033 (0.035)	−0.052 (0.046)	0.047 (0.033)	0.109*** (0.036)	−0.031 (0.030)	−0.029 (0.024)
<i>EXTD</i>	−0.231*** (0.027)	−0.238*** (0.033)	−0.231*** (0.043)	−0.160*** (0.052)	−0.129*** (0.055)	−0.181 (0.152)	−0.263*** (0.033)	−0.226*** (0.076)
<i>TP</i>	−0.022 (0.022)	0.015 (0.025)	−0.144*** (0.050)	0.048 (0.052)	−0.137*** (0.043)	−0.122*** (0.048)	0.062*** (0.027)	0.065* (0.037)
<i>EUI</i>	0.160 (0.123)	0.393** (0.214)	−0.138 (0.183)	−0.087 (0.299)	0.127 (0.253)	0.424 (0.501)	0.033 (0.111)	−0.034 (0.128)
<i>Constant</i>	3.290*** (0.726)	2.793*** (0.755)	6.688*** (0.924)	5.476*** (1.378)	0.403 (0.940)	1.449 (1.600)	0.596 (1.094)	2.205** (1.238)
<i>Pseudo R<sup>2</sup></i>	0.446	0.393	0.672	0.660	0.413	0.428	0.575	0.539
<i>Adj. R<sup>2</sup></i>	0.442	0.388	0.657	0.645	0.396	0.412	0.567	0.531
<i>No. of countries</i>	117	117	21	21	25	25	71	71
<i>No. of obs.</i>	1539	1539	306	306	472	472	761	761

Notes: Standard error in brackets. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

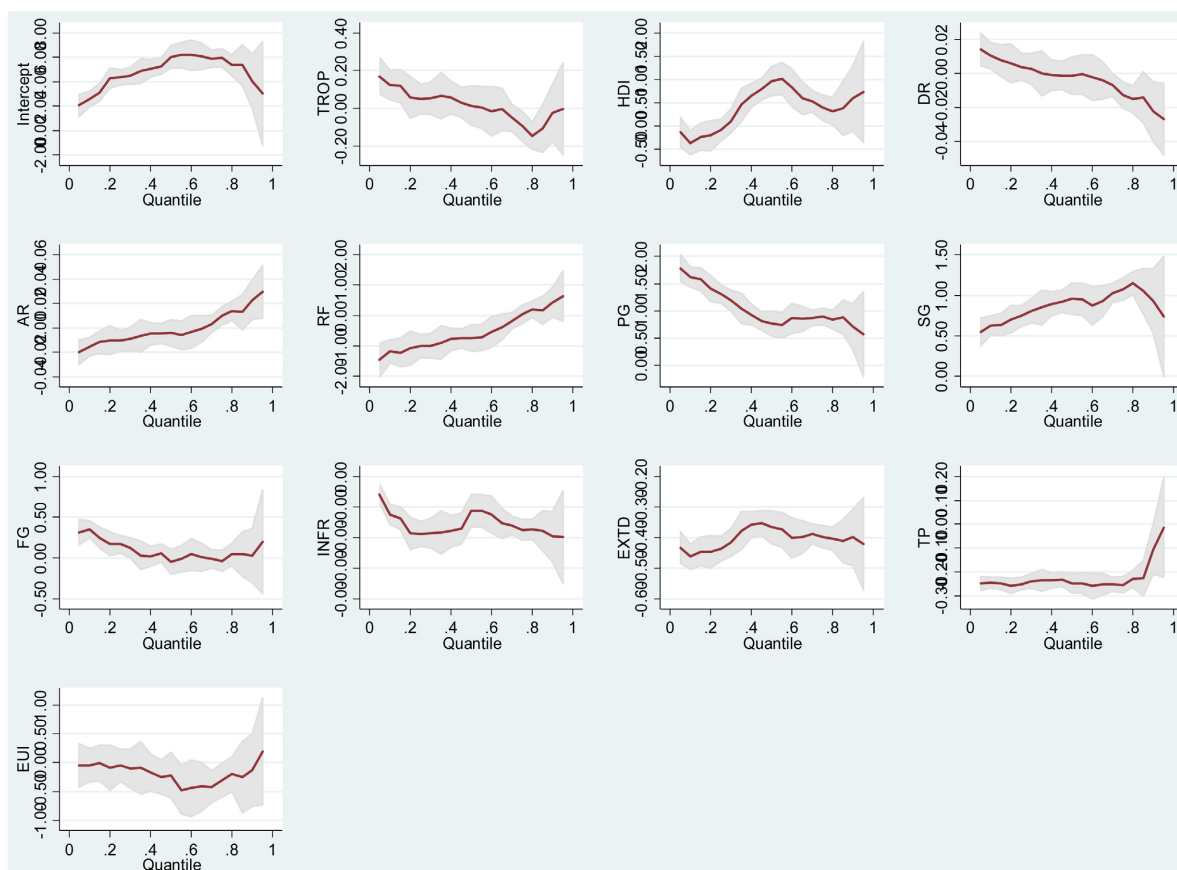
Further, the results of other groups of countries following the religious freedom index are quite contrary, and the empirical consequences are inconclusive. Moreover, results exhibit that trade openness significantly enhances economic

growth across the less-liberal and moderate-liberal religious beliefs countries. In contrast, empirical results demonstrate that at 90th quantiles, trade openness significantly dampens economic growth across high-liberal religious beliefs and practices groups countries (see Column 8, **Table 2**). This suggests that high-liberal in religious beliefs and practices does not facilitate economic growth. This is consistent with the findings of **Barro and McCleary (2003)**, indicating that high-liberal religious beliefs and practices and more extensive participation in church during working hours sometimes become impractical use of public resources, which harms the country's production and economic growth.

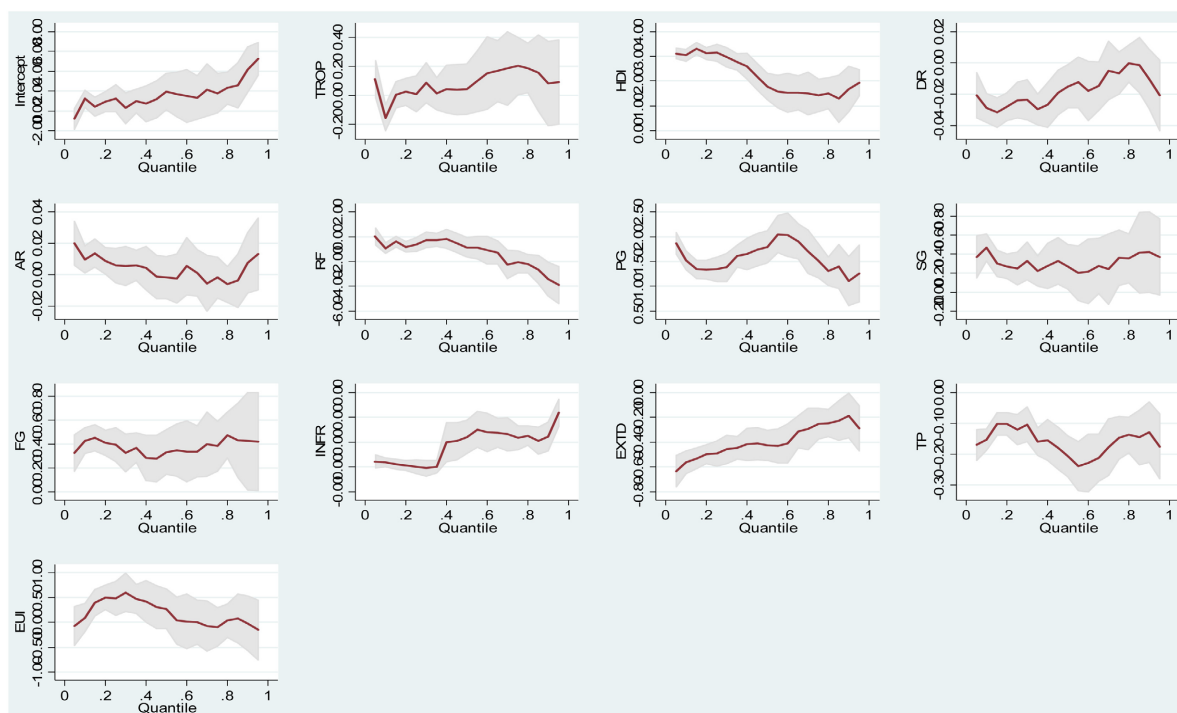
The effects of democratic regimes across most countries are negative and significantly different from zero. However, the coefficients of autocratic regimes in highly liberal religious belief countries are positive and significantly different from zero. This suggests that countries with highly liberal religious beliefs with a highly authoritarian system have higher economic growth.

Notwithstanding, religious belief plays a vital role in economic growth in highly liberal countries. However, religious freedom negatively affects the economic growth of moderately liberal countries. We then account for macroeconomic and specific control variables' effects on economic growth across different countries. Results reveal that social and political globalization substantially affects the economic growth of the sets of different countries. Further, results indicate that, like social openness, financial globalization is a relevant driver of economic growth across different sub-sets of religious openness countries. **Figures 5-7** portray the quantile plot of explanatory variables' effect on economic growth in groups like less, moderate and high-liberal countries. In the case of less-liberal groups of countries, **Figure 5** portrays that the quantile plot of the total population, social globalization, autocratic regimes, and religious freedom positively impact economic growth. The trade openness's impact on economic growth is pretty downward, which shows a declining trend at an early stage and later, its impact on economic growth is positive. The quantile plot shows economic policy uncertainty and external debt (% GDP), indicating that the financial stability parameters are swinging upwards and downwards, and fluctuating trends and these effects on economic growth fluctuate. In comparison, the quantile plot shows that political globalization and the rate of inflation adversely affect economic growth in the less-liberal religious freedom countries.

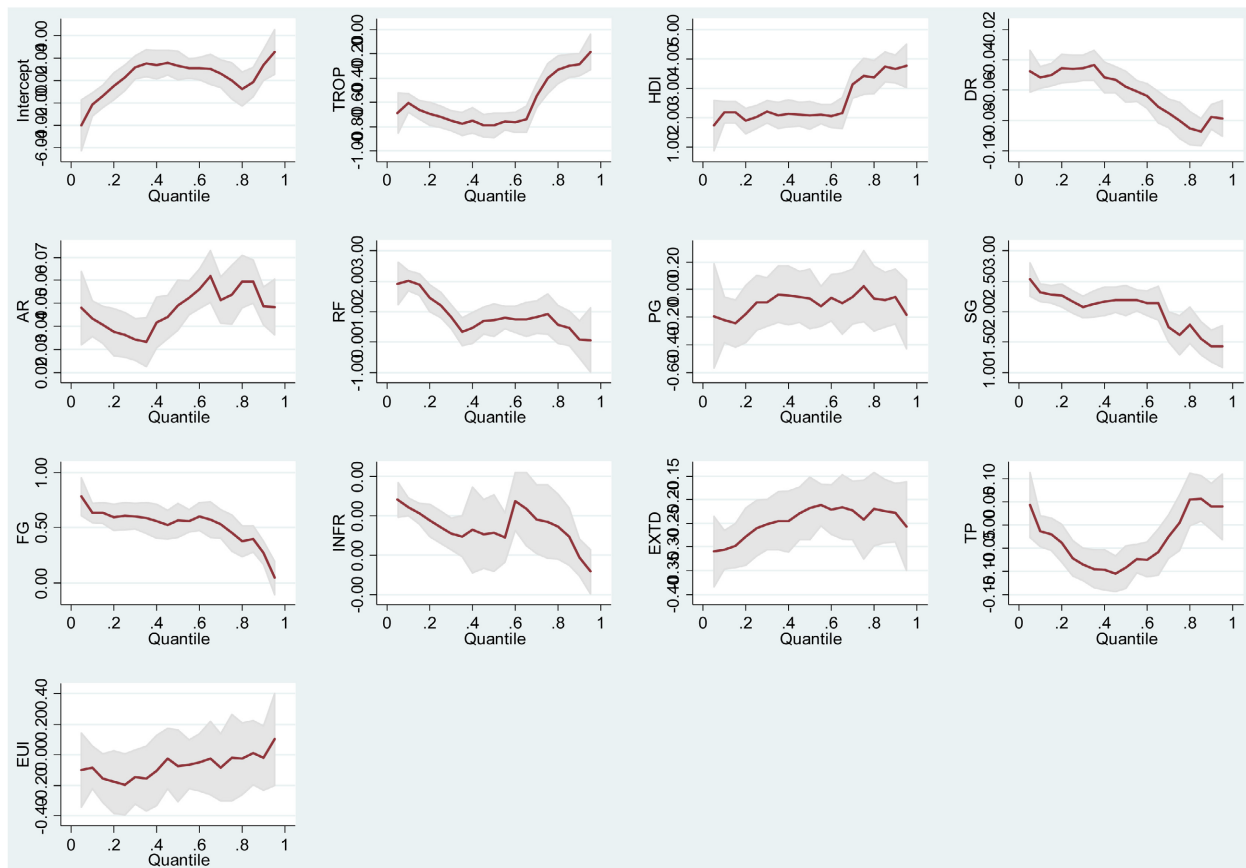
Nevertheless, **Figure 6** portrays that the effect of HDI, autocratic regimes and religious freedom on economic growth seems negative across moderate-liberal groups in religious beliefs and practices countries. However, the quantile plot shows that the effect of trade openness on economic growth seems positive and has upward trends. This is consistent with the empirical evidence obtained from the quantile regression results. Besides, the quantile plot shows the impact of economic policy uncertainty, social and financial globalization, total population (indicating the market size of a country), and inflation rate oscillating. This suggests that macroeconomic price instability, abrupt changes and uncertainty in



**Figure 5.** The effects of explanatory variables upon economic growth (less liberal).



**Figure 6.** The effects of explanatory variables upon economic growth (moderate-liberal).



**Figure 7.** The effects of explanatory variables upon economic growth (high-liberal).

economic policy adversely affect economic growth. This is possible because many emerging markets and developed countries passed through the phase of global financial shocks, oil price shocks, and the east Asian financial crisis during the 1990s and after the 2000s. As the financial markets are interrelated, and to overcome these shocks and to revamp the economy from these shocks, policy planners of many countries have taken unstable policies. Therefore, erratic changes in the economics and financial policies and macroeconomic price instability facilitated an adverse effect on economic growth.

**Figure 7** indicates that the quantile plot of trade openness shows a declining and rising trend during the study period. However, the quantile plot of religious freedom, democratic regimes, social and financial globalization, and the inflation rate seems to be declining. This indicates that a high and consistent inflation rate dampens economic growth across high-liberal countries. In contrast, economic policy uncertainty's effect on economic growth fluctuates. However, it appears to be a positive impact on economic growth across the groups of highly liberal religious beliefs and practices countries. Although the quantile plot shows decreasing trend at an early period, after a certain period, the trend shows rising, indicating that economic policy uncertainty even positively affects economic growth.

Across quantiles and for all countries, financial sector stability measured by the external debt coefficients is negative and significantly different from zero. Therefore, this result complies with the argument that greater financial instability would decrease countries' economic growth. Alternatively, as we discussed before, we re-estimate the empirical model using the MM-QR technique to avoid endogeneity bias. The MM-QR estimated results are reported in **Table 3**. The trade openness variable remains negative and significant in highly liberal means

**Table 3.** MM-QR results.

	Full-panels		Less-liberal (RF $\leq$ 0.5)		Moderate-liberal (0.5 $\leq$ RF $\leq$ 0.75)		High-liberal RF ( $\geq$ 0.75)	
	$\tau = 0.75$	$\tau = 0.90$	$\tau = 0.75$	$\tau = 0.90$	$\tau = 0.75$	$\tau = 0.90$	$\tau = 0.75$	$\tau = 0.90$
<i>TROP</i>	-0.248*** (0.042)	-0.245*** (0.055)	0.213*** (0.090)	0.244** (0.114)	0.404*** (0.102)	0.512*** (0.122)	-0.257*** (0.043)	-0.199*** (0.055)
<i>HDI</i>	2.513*** (0.198)	2.768*** (0.187)	3.045*** (0.296)	3.092*** (0.322)	0.809*** (0.332)	0.438 (0.474)	5.058*** (0.208)	5.457*** (0.244)
<i>DR</i>	-0.027*** (0.004)	-0.031*** (0.006)	0.001 (0.008)	-0.003 (0.011)	-0.007 (0.009)	-0.006 (0.011)	-0.075*** (0.006)	-0.081*** (0.009)
<i>AR</i>	0.027*** (0.004)	0.033*** (0.006)	-0.004 (0.009)	0.001 (0.012)	0.012 (0.009)	0.012 (0.012)	0.073*** (0.007)	0.079*** (0.009)
<i>RF</i>	0.530*** (0.119)	0.698*** (0.164)	-0.338 (0.279)	-0.121 (0.367)	-1.672*** (0.495)	-2.029*** (0.580)	1.158*** (0.189)	1.049*** (0.241)
<i>PG</i>	0.125 (0.121)	-0.132 (0.160)	0.005 (0.195)	-0.369 (0.257)	1.581*** (0.234)	1.537*** (0.288)	-0.514*** (0.085)	-0.551*** (0.112)
<i>SG</i>	1.258*** (0.085)	0.972*** (0.079)	1.181*** (0.157)	1.313*** (0.207)	1.054*** (0.217)	1.227*** (0.254)	1.286*** (0.115)	1.055*** (0.143)
<i>FG</i>	0.433*** (0.051)	0.402*** (0.067)	0.168*** (0.076)	0.207** (0.097)	0.473*** (0.119)	0.454*** (0.143)	0.751*** (0.065)	0.693*** (0.086)
<i>INFR</i>	0.027** (0.012)	0.042*** (0.016)	-0.046 (0.031)	-0.055 (0.041)	0.065** (0.032)	0.069* (0.040)	-0.045*** (0.011)	-0.037*** (0.013)
<i>EXTD</i>	-0.222*** (0.021)	-0.257*** (0.030)	-0.185*** (0.045)	-0.186*** (0.062)	-0.297*** (0.109)	-0.229* (0.139)	-0.176*** (0.009)	-0.190*** (0.012)
<i>TP</i>	-0.023 (0.018)	-0.012 (0.023)	-0.069** (0.032)	-0.026 (0.040)	-0.150*** (0.042)	-0.135*** (0.053)	0.056*** (0.013)	0.059*** (0.016)
<i>EUI</i>	0.151 (0.115)	0.258* (0.159)	-0.312* (0.207)	-0.298 (0.260)	-0.169 (0.255)	-0.221 (0.318)	-0.144** (0.076)	-0.052 (0.095)
<i>Constant</i>	2.363*** (0.504)	4.163*** (0.664)	5.777*** (0.784)	6.531*** (0.998)	1.508 (1.044)	1.499 (1.298)	0.032 (0.505)	1.222** (0.618)
<i>No. of countries</i>	117	117	21	21	25	25	71	71
<i>No. of obs.</i>	1539	1539	306	306	472	472	761	761

Notes: Standard error in brackets. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

high openness religious belief groups of countries. This confirms our previous findings that high liberal religious belief does not necessarily facilitate the countries' economic growth. Instead, results demonstrate that other institutional and macroeconomic variables like autocratic regimes and social and financial globalization substantially affect countries' economic growth. Our results provide considerable evidence for the hypothesis that countries with highly liberal religious beliefs can promote growth, which goes beyond the existing findings on the association between economic growth and trade policy.

Further, results reveal that economic uncertainty across countries adversely affects the economic growth of various countries. This suggests that countries with a high volatility of uncertainty in democratic regimes and high economic uncertainty reversely affect economic growth. Nevertheless, external effects like expenditure on human capital, an essential element in the growth of knowledge and skills of the labour, argued that the population with human capital has a similar role in enhancing economic growth. Hence, we can say that HDI promotes growth through higher trade flows.

#### **4. Conclusion**

This study attempts to differentiate the heterogeneous role of trade openness in growth acceleration among countries under various categories of religious freedom. Further, by introducing a political set-up (democratic-autocratic governance) within our model alongside religious freedom, we conclude that countries endowed with high liberals in religious belief experience more significant growth in income per capita. Our results are robust in accounting for institutional, macroeconomic, and specific control variables and correcting possible endogeneity in estimation. Further, improved social openness, increased human development, and increased religious tolerance could accelerate economic growth. Empirical results reveal that the relationship between openness to trade and economic growth across developing countries is subject to the institutional environment.

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#### **Conflicts of Interest**

The authors declare no conflicts of interest regarding the publication of this paper.

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## Appendix

**Table A1.** Classification of countries based on RF.

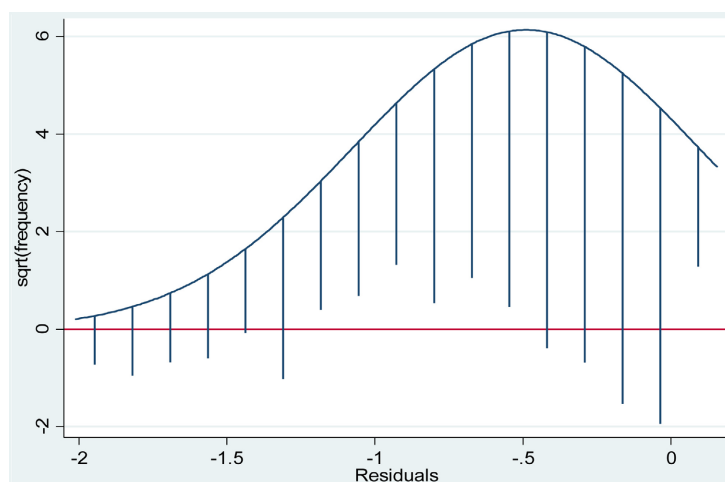
Less liberal (<0.5) (21 Countries)	Moderate liberal ( $0.5 \leq RF \leq 0.75$ ) (25 Countries)	High liberal RF (>0.75) (71 Countries and Regions)
Egypt, Mauritania, Morocco, Myanmar, Pakistan, Sudan, Tunisia, Uzbekistan, Vietnam, Algeria, Azerbaijan, China, Cuba, Iran, Iraq, Libya, Malaysia, Mauritius, Turkmenistan, Qatar, Saudi Arabia	Angola, Bangladesh, Cambodia, Congo, India, Indonesia, Kenya, Kyrgyzstan, Moldova, Nigeria, Zimbabwe, Armenia, Belarus, Georgia, Guatemala, Jordan, Russia, Sri Lanka, Thailand, Türkiye, Greece, Kuwait, Oman, Singapore, UAE	Bolivia, Cameroon, Ivory Coast, El Salvador, Ghana, Honduras, Lesotho, Mongolia, Nicaragua, Papua New Guinea, Philippines, Senegal, Ukraine, Zambia, Albania, Argentina, Botswana, Brazil, Bulgaria, Colombia, Costa Rica, Dominican Republic, Equatorial Guinea, Ecuador, Gabon, Jamaica, Kazakhstan, Lebanon, Mexico, Namibia, Paraguay, Peru, Romania, South Africa, Venezuela, Australia, Austria, Belgium, Canada, Chile, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Israel, Italy, Japan, South Korea, Latvia, Lithuania, Netherlands, New Zealand, Norway, Panama, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Taiwan region, UK, USA, Uruguay

**Table A2.** Description of variables and sources of the data.

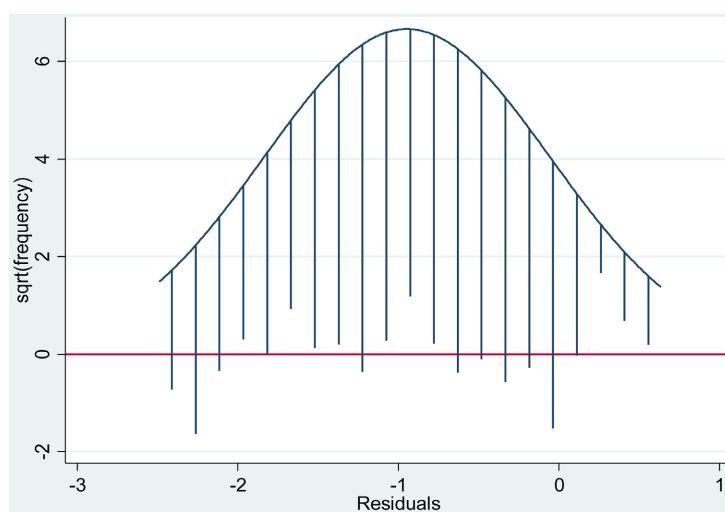
Variables	Definition	Measures	Sources
<b>Outcome variable</b>			
GDP Percapita ( <i>GDPpc</i> )	GDP per capita is gross domestic product divided by midyear population	In terms of the annual percentage of growth	World Development Indicators (WDI) database of the World Bank
<b>Major Explanatory variable</b>			
Trade Openness ( <i>TROP</i> )	The sum of a country's exports and imports as the share of that country's Gross Domestic Product	The ratio of exports and imports to GDP (%)	Penn World Table Version 9.1
<b>Control Variables</b>			
Human Development Index ( <i>HDI</i> )	A composite index measuring the achievement in three dimensions life expectancy, knowledge in the form of education, and standard of living	The score of HDI for each economy ranges from 0 to 1	United Nations Development Programme (UNDP) database
Democratic Regime ( <i>DR</i> )	Democratic regime indicates the presence of institutionalized democracy in terms of rules of law, systems of checks and balances, and freedom of the press	Annual Scores of democratic regimes range from 0 to 10. Countries close to a score of 10 represent more democratic regimes	Polity IV database, Centre for Systemic Peace, Virginia
Autocratic regime ( <i>AR</i> )	The systems with a lack of regularized political competition and concerns for political freedom	Scores of AR range from 0 to 10. Economies with scores nearing ten are considered to be having highly autocratic regimes	Polity IV database, Centre for Systemic Peace, Virginia

## Continued

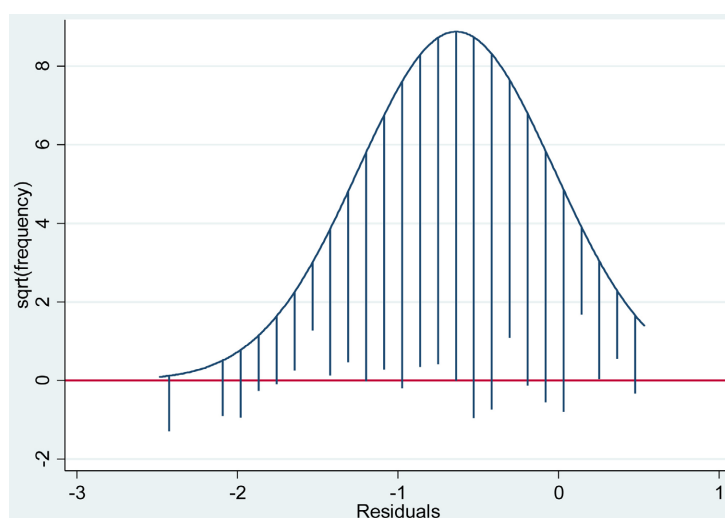
Religious Freedom ( <i>RF</i> )	Freedom of religion indicates the freedom of an individual to pursue and manifest his own religious beliefs, worships, and other religious practices without any pressure and difficulties.	This index is scored within the range of 0 to 1. Countries with scores nearing one are considered to be highly liberal from the standpoint of religious practices	GovData360 database of the World Bank
Political globalization ( <i>PG</i> )	Diffusion of government policies	The political openness index ranges from 0 to 100. Countries close to 100 are politically more advanced.	KOF index, ETH Zurich
Social globalization ( <i>SG</i> )	It refers to sharing ideas and information between and through different countries.	The social openness index ranges from 0 to 100. Countries close to 100 are socially more advanced.	KOF index, ETH Zurich
Financial Globalization ( <i>FG</i> )	measured by the capital flows and stocks of foreign assets and liabilities	The financial globalization index ranges from 0 to 100. Countries close to 100 are politically more advanced.	KOF index, ETH Zurich
Economic Uncertainty ( <i>EU</i> )	It considers three types of uncertainties – newspaper coverage of policy-related economic uncertainty, the number of federal tax code provisions set to expire in future years, and disagreement among the economic forecasters as a proxy for uncertainty.	Annual scores of this index range from 0 to 1. Economies with scores nearing 1 indicate a greater degree of economic uncertainty in that year.	Economic Policy Uncertainty Institute
Inflation rate ( <i>INFR</i> )	It measures the average change in the cost to the average consumer of acquiring a basket of goods and services at a yearly interval.	In terms of the annual percentage of growth	World Development Indicators (WDI) database of the World Bank
Total population ( <i>TP</i> )	Number of population, which counts all residents regardless of citizenship	Number of population	World Development Indicators (WDI) database of the World Bank
External debt (%GDP) <i>EXTD</i>	Total external debt measures the sum of publicly guaranteed, and privately nonguaranteed long-term debt, use of IMF credit, and also short-term debt	As a percentage of GDP growth	World Development Indicators (WDI) database of the World Bank



**Figure A1.** Hanging rootogram for quantile regression (less liberal).



**Figure A2.** Hanging rootogram for quantile regression (moderate-liberal).



**Figure A3.** Hanging rootogram for quantile regression (high-liberal).